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The impact of the COVID-19 pandemic on paediatric emergency service

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Abstract

Aims: The aims of this research were to review patients visiting the paediatric emergency department over a 6-month period 1 year before and during the pandemic, to review paediatric emergency department referral ratios and to determine whether there were any significant decreases in mortality and morbidity.

Methods: All patients from the ages of 0 to 18 years visiting the University of Health Sciences, Ankara Research and Training Hospital, paediatric emergency service from April-October 2019 to April-October 2020 with no missing information in their records were involved in this retrospective cross-sectional study.

Results: The total number of paediatric emergency service consultations was 74 739; the number of emergency visits from April to October 2019 was 55 678, whereas it was 19 061 from April to October 2020 in the midst of the COVID-19 pandemic period. There was a 67.7% decrease in consultations during the pandemic period. The mean age of participants from April to October 2019 was 8.11 ± 5.31 years, and 52.4% of cases were male. The mean age from April to October 2020 was 8.58 ± 5.93 years, and 51% of cases were male. COVID-19-related symptoms were higher during the pandemic period ($P < .05$), with fever and gastroenteritis being the most frequently received diagnosis in both periods. During the pandemic period, the newborn consultation ratio was higher ($P > .05$), there was a decrease in consultation ratios related to suicide attempts ($P < .05$), and a threefold increase in death rates was observed ($P < .05$).

Conclusion: In Turkey, where emergency consultation rates are quite high, these decreases look fearsome for secondary injuries that can develop in children. For this reason, families should be made aware of the importance of bringing their children to the hospital during emergencies, and that all necessary health precautions are being taken to decrease the spread of infection in hospitals.

1 | INTRODUCTION

A novel coronavirus known as pneumonia-related SARS-COV2 (severe acute respiratory syndrome coronavirus 2) was first reported in China in December 2019. During the following weeks, the virus quickly spread around the world. The World Health Organization declared a public health emergency of international concern on 30 January 2020 and referred to this outbreak as COVID-19 on 12 February 2020.[1] The first case in Turkey was reported on 11 March 2020. The disease can spread via droplet transmission[2] and also via the respiratory secretions of asymptomatic people.

The COVID-19 pandemic has created concern and uncertainty around the world. Even though the disease has a better prognosis in children, the fear parents have of getting COVID-19

prevents them from bringing their children to emergency service departments.[3,4] With the closure of in-class lessons at schools, a significant decrease in infectious diseases has been observed in many countries.[5,6] Schools were closed to students and teachers in Turkey on 16 March 2020, resulting in children receiving their educations at home and staying away from crowded areas. This situation has contributed to the decrease of infectious diseases, which are the most frequent reason for the referral of children to emergency departments.

The aim of this study was to assess the impact of the first 6 months of the COVID-19 pandemic on the number and type of consultations to the paediatric Emergency Department (ED) and whether there was any effect on paediatric ED-related morbidity and mortality.

What's known

As a result of pandemic restrictions and fear of disease transmission, the number of hospital emergency service admissions decreased significantly.

What's new

Experiences are shared by analysing consultations to the paediatric emergency department during the pandemic period and evaluating these consultations.

2 | MATERIALS AND METHODS

All patients from the age of 0 to 18 years who visited the University of Health Sciences, Ankara Research and Training Hospital, paediatric emergency service from April-October 2019 to April-October 2020 with no missing information in their records were involved in this retrospective cross-sectional study. This hospital is located at the centre of Ankara, the capital of Turkey and the socioeconomic level of incoming patients is typically low, with approximately 10% of them being Syrian refugees. Patients generally come from the outskirts of the city from a distance of about 50 km. The Chronic disease information for the participants in the consultations could not be accessed. The symptoms included as COVID-19-related symptoms are fever, cough, upper respiratory tract infection, nausea-vomiting and diarrhoea. As the pandemic was declared in Turkey on 11 March 2020, the data from April were examined in this research. All participants with complete data were included in the study. Emergency service at this hospital is available 24 hours a day, 7 days a week and is rendered by a monthly rotation of four to five paediatric residents under the guidance of two paediatric emergencies specialists' weekdays from 8 AM to 4 PM and one paediatrician from 4 PM to 8 AM on weekdays and weekends.

2.1 | Data collection

Electronic data records (including patient age, gender, and distribution of total number of consultations for admission diagnosis by month) for patients who visited the paediatric emergency service in 2019 and 2020 from the months of April to October were accessed for the purposes of data collection.

2.2 | Statistical analysis

Statistical analysis of the study was performed by using SPSS 18.0 and Microsoft Office Excel 2003. The descriptive values of the obtained data were calculated as number and percentage frequency and mean ± standard deviation. The chi-square test was used for the categorical comparison of groups, while *t*-tests for the difference between two independent means were used for comparison in terms of properties specified by measurement. The mean of more than two groups was compared with variant analysis. Regression analysis was used for the investigation of relationships between variables. A P value of $<.05$ was considered statistically significant.

3 | RESULTS

The total number of paediatric emergency service consultations during the dates covered by this study period was 74 739; the number of visits from April to October 2019 was 55 678, whereas it was 19 061 from April to October 2020 in the midst of the COVID-19 pandemic period. The numbers of consultations according to months are shown in Figure 1.

From April to October 2019, 874 (1.6%) patients were from the ages of 0 to 1 months, while the remaining 54 804 (98.4%) patients were from the ages of 1 month to 18 years old. The mean age was 8.11 ± 5.31 years, with 29 215 (52.4%) being male and 26 578 (47.6%) being female. From April to October 2020, 639 (3.4%) patients were from the age of 0 to 1 months, while 18 422 (96.6%) patients were from the age of 1 month to 18 years old. The mean age was 8.58 ± 5.93 years, in which 9782 (51%) were male and 9380 (48.9%) were female. The number of consultations by age group for 2019 were as follows: neonate = 874 (1.6%), infant (1 month-2 year) = 15 224 (27.3%), toddler (2-6 year) = 10 248 (18.4%), child (7-14 years) = 16 531 (29.6%) and teen (14-18 years) = 12 801 (23.1%). In 2020, the number of consultations by age group were neonate = 639 (3.4%), infant (1 month-2 year) = 5690 (29.8%), toddler (2-6 year) = 4036 (21.1%), child (7-14 years) = 5102 (26.7%) and teen (14-18 years) = 3594 (19.0%). The hospitalisation rate for 2019 was 4.3%, while the hospitalisation rate for 2020 was 6.2%. The 10 most frequent referral reasons to paediatric emergency service are shown in Table 1, comparing the same periods (April-October) in 2019 and 2020.

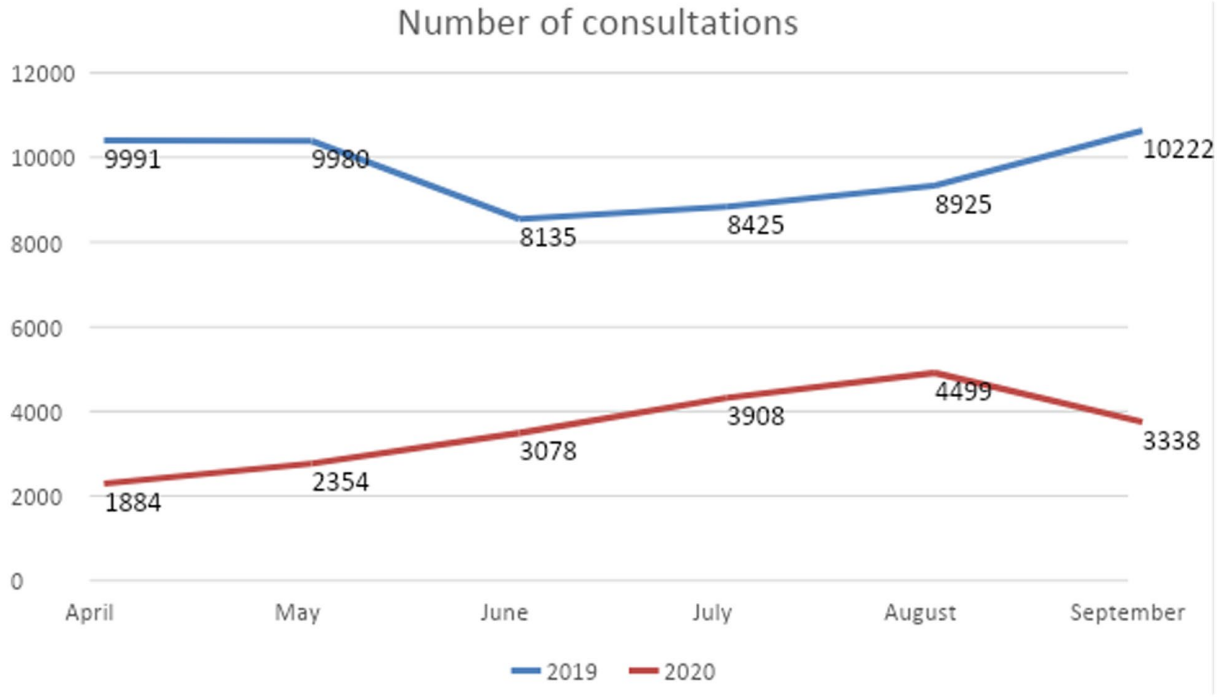

FIGURE 1 Distribution of the number of consultations to paediatric emergency service by month for 2019 and 2020

TABLE 1 Comparison of the 10 most common consultation diagnosis for 2019 and 2020

Diagnosis	n (%)
April-October 2019	
Acute tonsillitis	7608 (13.7)
Abdominal pain	4280 (7.7)
Acute nasopharyngitis	3960 (7.1)
Gastroenteritis and colitis	3454 (6.2)
Nausea and vomiting	3115 (5.6)
Fever, unspecified	2192 (3.9)
Cystitis	1955 (3.5)
Acute bronchiolitis	1722 (3.1)
Acute upper respiratory tract infection	1656 (3.0)
Cough	1461 (2.6)
April-October 2020	
Fever	1877 (9.8)
COVID-19	1367 (7.2)
Abdominal pain	1336 (7.0)
General examination	1071 (5.6)
Gastroenteritis and colitis	679 (3.6)
Nausea and vomiting	662 (3.5)
Cough	602 (3.2)
Acute tonsillitis	568 (3.0)
The condition arising from the perinatal period	486 (4.0)
The disease of upper airway	469 (2.5)

In the distribution of the 10 most frequently given diagnoses by month for the April-October 2019 period, significant changes were found only in the number of admissions for gastroenteritis and acute tonsillitis (AT), where gastroenteritis cases increased and AT cases showed a marked decrease over the summer months. Moreover, in the distribution of the 10 most frequently given diagnoses according to month for the April-October 2020 period, unspecified fever diagnoses showed a gradual increase from April to October ($P = .048$), remaining at the same level as May as in the months after for COVID-19 diagnosis. The number of patients with COVID-19 PCR (+) detected was 571 (41.8%) out of a total of 1,367 patients diagnosed with COVID-19. The number of monthly COVID-19 PCR (+) detections from April 2020 was 16, 36, 52, 101, 181 and 187, respectively. Distributions of the 10 most frequently given diagnosis from April to October in 2019 and 2020 are shown in Figure 2.

When consultations for suicide attempts are examined, one of the special diagnoses of paediatric emergency service, in the April to October 2019 period there were 187 (0.34%) visits related to this issue, while the number was 31 (0.61%) for the same period in 2020. The number of patients visiting the emergency service for this issue decreased six-fold, although the percentage of patients increased by half. However, this situation was not statistically significant ($P = .743$) (Table 2).

The same two diagnoses (cardiac and respiratory arrest) were reported for all COVID-19-related deaths at this hospital, although no COVID-19-related deaths were reported for the under 18 age group for the period of April to October 2020. The paediatric intensive care unit of this hospital has four beds which are located on the

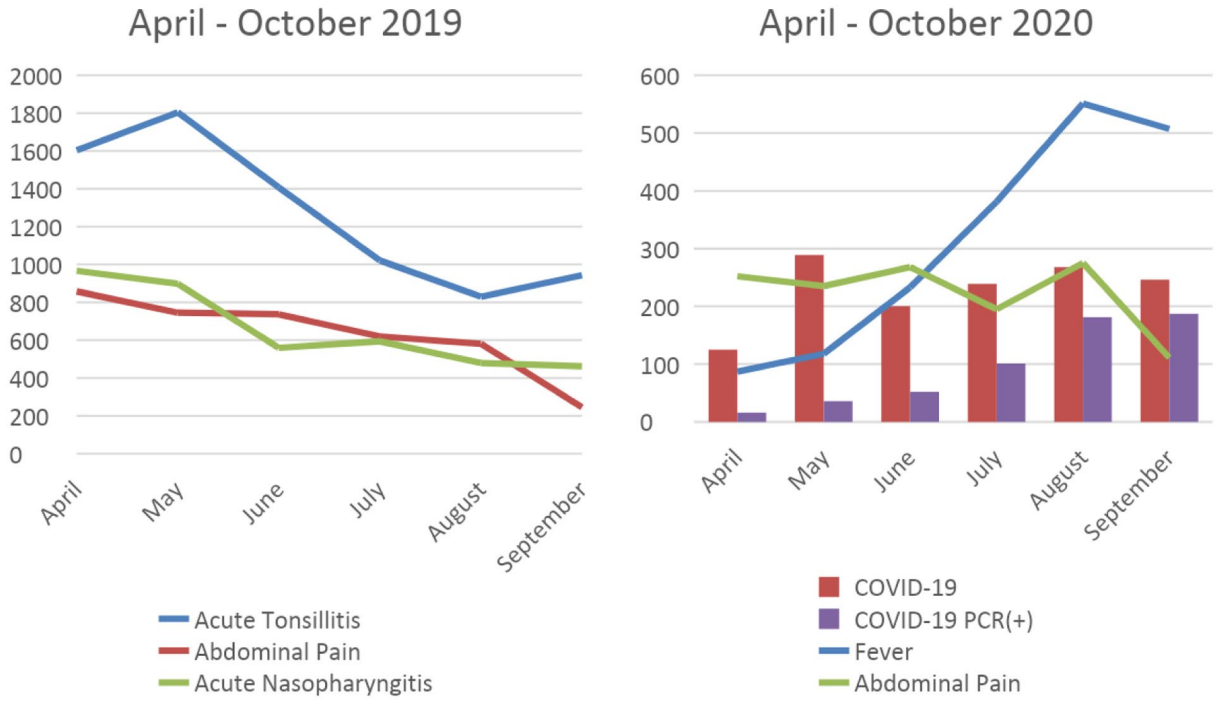

FIGURE 2 Distribution of the three most frequently given diagnoses by month for the April-October period of 2019 and 2020

TABLE 2 Comparison of variables for the same periods of 2019 and 2020

	April-October 2019 n (%)	April-October 2020 n (%)	*P*
Total	55 678	19 061	**.022**
Gender			.078
Male	29 215 (52.4)	9782 (51.0)	
Female	26 578 (47.6)	9380 (48.9)	
Number of 0-1 month old baby consultations	874 (1.6)	639 (3.4)	.548
Mean age	8.11 ± 5.31	8.58 ± 5.93	.157
Number of consultations for COVID-19-related symptoms	11 478 (20.6)	4967 (26.1)	**.046**
Number of suicide consultations	187 (0.34)	31 (0.16)	.743
Number of hospitalisations in PICU	402 (0.72)	307 (1.61)	**<.001**
Total number of deaths	11 (0.02)	14 (0.07)	**.040**

Abbreviation: PICU, paediatric intensive care units.
Bolded values are statistically significant.

second level of the hospital. It was determined that the period before the pandemic and being a Turkish citizen significantly affected admission to intensive care in a statistically significant way ($P < .001$) (Table 3).

Before the pandemic period, death and consultation to paediatric intensive care units showed a low level of positive correlation ($r = 0.13$, $P < .001$; $r = 0.40$; $P < .001$), being a Turkish citizen was found to be negatively correlated at a low level ($r = -0.012$, $P = .001$) (Table 4).

4 | DISCUSSION

The data show that during the COVID-19 pandemic the number of patients visiting the paediatric emergency service department of the Ankara Training and Research Hospital, which is a tertiary health institution in Turkey's capital Ankara, and those yearly average patient number is typically around 120 000, decreased by 67.6%. These data support previous studies,[7,8] although these focus on patient consultations in adult emergency service in

TABLE 3 Regression analysis of variables for pre- and post-pandemic

	B	SE	Wald	*df*	Sig.	Exp (B)
Step 1[a]						
Consultation	−.799	.078	105 500	1	.000	.450
Death	−25 684	7 914 091	.000	1	.997	.000
Gender	.050	.077	.428	1	.513	1052
Neonate			6563	4	.161	
Infant	−.291	.124	5526	1	.019	.748
Toddler	−.046	.116	.156	1	.693	.955
Child	−.153	.119	1657	1	.198	.858
Teen	−.145	.119	1500	1	.221	.865
SS: low			1391	3	.708	
SS: medium	−.039	.106	.135	1	.713	.962
SS: high	−.128	.110	1346	1	.246	.880
SS: unknown	−.049	.108	.208	1	.648	.952
C: Turkish			27 009	2	.000	
C: Foreign	−1809	.368	24 198	1	.000	.164
C: Refugee	−.073	1086	.005	1	.946	.929
Constant	23 476	7 914 091	.000	1	.998	15 684 473 218 178

Abbreviations: C, citizenship; SS, socioeconomic status.

[a]Variable(s) entered on step 1: Consultation, Death, Gender, Age group, Socioeconomic status, Citizenship.

Turkey. No study covering the comparison of the number of paediatric emergency service admissions in Turkey was found.[7] Even though this decrease during the pandemic period is believed to be related to the pandemic itself in addition to many other factors, data are very limited and need to be supported and elucidated by more studies.

With the arrival of the COVID-19 outbreak, there was great fear and panic all over the world.[5] Twelve cases of children, of which four died, admitted to the paediatric intensive care unit were reported with a severe clinical picture associated with COVID-19 parental anxiety.[10] Likewise, during the pandemic period, delayed cancer cases and high mortality rates were reported from the United States.[11] In the present study, the number and rate of deaths increased significantly during the pandemic period. This situation reveals that, even though COVID-19 is not fatal in children and is believed to be asymptomatic in that age group,[1,12] families are hesitant about the possibility of hospital-borne contamination when bringing their children to the hospital even in emergency situations. So, the greatest danger is the increase in delayed and unmet need, in other words, the increase in cases of neglect.[13,14] In this study, it can be seen that the period when the cases decreased the most coincided with the period when the epidemic had just started in the country, when the uncertainty was more.

Since health care is provided for both COVID-19 positive, COVID-19 suspicious and COVID-19 unrelated patients, and even though attempts are made to follow and treat them according to isolation rules, written consent is being taken from families to give information about the disease, to warn them about disease transmission, and to get their consent for monitoring in the observation ward. This again raises concerns and limits the intake of medical care for most families.[5] For a similar reason, it can be said that fever, which is accepted as one of the COVID-19 symptoms, is raising families' concerns by prolonging hospital stays because of requirements for detailed physical and laboratory examinations, especially in infants.

In Turkey, as of 16 March 2020, schools were closed and community gatherings and travel were restricted, meaning that children spent more time at home and were protected from infectious diseases. This is another reason explaining the decline in emergency consultations.

Newborn consultations were considered a special group during the pandemic period, and when these consultations are examined more closely, although there was a decrease in the number of consultations compared with the previous year, it was not found to be statistically significant. In one case report, in which the rate of referrals to neonatal intensive care units of multiple centres during and before the pandemic period was presented, it was determined that the rate of admissions to neonatal intensive care units decreased significantly, and it was emphasized that these results may depend on factors such as the mothers' pregnancy period being more comfortable because of resting at home, removal from crowds and transmission risks, and being away from other risk factors that could trigger premature birth.[15] In the present study, although the number of newborn consultations seems to be lower during the pandemic period, when consultation rates are investigated, they were found to be higher than the previous year. An assumption can be made here

TABLE 4 Correlation analysis of demographic data for pre and post pandemic

	Consultation	Death	PICU	Gender	Age group	Socioeconomic status	Citizenship
Consultation							
Pearson correlation	1	.013[a]	.040[a]	.007	−.001	.001	−.012[a]
Sig. (two-tailed)		.000	.000	.073	.871	.724	.001
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
Death							
Pearson correlation	.013[a]	1	.187[a]	.001	.005	.000	.030[a]
Sig. (two-tailed)	.000		.000	.840	.165	.929	.000
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
PICU							
Pearson correlation	.040[a]	.187[a]	1	−.002	.007	.002	.025[a]
Sig. (two-tailed)	.000	.000		.629	.058	.601	.000
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
Gender							
Pearson correlation	.007	.001	−.002	1	.003	−.001	.010[a]
Sig. (two-tailed)	.073	.840	.629		.375	.765	.008
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
Age group							
Pearson correlation	−.001	.005	.007	.003	1	−.003	−.005
Sig. (two-tailed)	.871	.165	.058	.375		.460	.157
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
Socioeconomic status							
Pearson correlation	.001	.000	.002	−.001	−.003	1	−.001
Sig. (two-tailed)	.724	.929	.601	.765	.460		.772
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739
Citizenship							
Pearson correlation	−.012[a]	.030[a]	.025[a]	.010[a]	−.005	−.001	1
Sig. (two-tailed)	.001	.000	.000	.008	.157	.772	
N	74 739	74 739	74 739	74 739	74 739	74 739	74 739

[a]Correlation is significant at the .01 level (two-tailed).

that this situation may be because of inexperience (ie, this is the first child for the family) or the fact that anxiety about something happening to the baby is higher than anxiety related to possible coronavirus transmission.

The consequences of the pandemic regarding suicide may vary depending on public health control measures, socio-cultural and demographic structures of the countries, access to face-to-face teleconferencing for patients, and available support.[16] In the current study, the number of consultations for suicide intervention decreased significantly, which suggests that this can be the effect of being under the supervision of families at home and staying away from negative social environments, school, and friends. While some studies in the literature suggest our study,[9] that suicide attempts have increased in others.[17]

The greatest limitation of this study was that it was conducted in a single centre. However, since there was a large patient base, choosing the 10 most frequently entered diagnoses and focussing on those was the best course of action.

5 | CONCLUSION

As a result of the COVID-19 pandemic, many regulations in Turkey as well as all over the world have changed. The decreases seen in this research in Turkey, where emergency consultation rates are very high, seem frightening in terms of secondary injury that can develop in children. The decrease in the number of referrals to the paediatric emergency department can lead to late diagnosis and negligence of sick children. Necessary information should be provided so that parents do not worry about their child coming to the emergency room. For this reason, families should be made aware of the importance of bringing their children to the hospital during

emergencies, and that all necessary health precautions are being taken to decrease the spread of infection in hospitals.

RESEARCH INVOLVING HUMAN PARTICIPANTS AND/OR ANIMALS

This study only involved human participants.

INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (A consent has been taken 420 number from the University of Health Sciences Ankara Research and Training Hospital Ethics Committee on 30.12.2020 for this study.) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

DISCLOSURES

All of the authors declare no conflict of interest concerning the research, authorship or publication of this article.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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